

1. A method for providing engine operating control, comprising:
  - reforming at least a fraction of fuel injected into an onboard fuel reformer;
  - injecting reformate from said onboard fuel reformer into a charge intake of an engine cylinder; and
  - controlling compression ignition properties of the charge intake by at least one of adjusting composition of the reformate and controlling a temperature of said charge intake based on exothermicity of reactions in the onboard fuel reformer.
2. The method of claim 1, wherein said step of controlling compression ignition properties includes both adjusting composition of the reformate to control compression ignition properties of the charge intake and controlling a temperature of said charge intake based on exothermicity of reactions in the onboard fuel reformer.
3. The method of claim 1, further comprising controlling a bias flow that increases or decreases fluid flow through the reformer.
4. The method of claim 1, wherein the charge intake is stratified so that the distribution of the reformate in the engine cylinder is non-uniform.
- 20 5. The method of claim 1, wherein the reformate is used to establish temperature gradients in the engine cylinder.
6. The method of claim 1, wherein the onboard fuel reformer is a fast starting reformer that allows for adequate engine operation during start up when the engine is run as a spark ignition engine and allows for adequate engine operation in the presence of transients.
- 25 7. The method of claim 1, wherein the onboard fuel reformer is a plasmatron fuel converter.
8. The method of claim 1, wherein said onboard fuel reformer includes a catalyst.

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9. The method of claim 1, where the reformate is premixed with air before being injected into the charge intake of the engine cylinder.
10. The method of claim 1, wherein the reformate is injected directly into the charge intake of the engine cylinder.  
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11. The method of claim 1, wherein the reformate is passed through a heat exchanger prior to injection into the cylinder or premixing with the air, fuel or air/fuel mixture.
- 10 12. The method of claim 1, wherein the reformer is controlled by signals that are controlled by a computer having engine sensors for evaluation of engine operation and that takes into account operator requirements.  
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13. The method of claim 1, wherein fuel blending is utilized to control said composition.  
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14. A system for providing engine operating control, comprising:
  - an onboard fuel reformer that reforms at least a fraction of fuel injected therein from a fuel source;
  - an engine having at least one engine cylinder adapted to receive reformate from said onboard fuel reformer as a charge intake to the engine cylinder; and
  - 20 a control mechanism connected to said onboard fuel reformer and which controls compression ignition properties of the charge intake by at least one of:
    - adjusting composition of the reformate and controlling a temperature of said charge intake based on exothermicity of reactions in the onboard fuel reformer.
- 25 15. The system of claim 14, wherein said control mechanism controls compression ignition properties of the charge intake by both adjusting composition of the reformate and controlling a temperature of said charge intake based on exothermicity of reactions in the onboard fuel reformer.  
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16. The system of claim 14, wherein said control mechanism is a computer having engine  
sensors that evaluate engine operation.

17. The system of claim 16, wherein said computer is adapted to receive as input external  
5 operator requirements.

18. The system of claim 14, further comprising a heat exchanger disposed between said fuel  
reformer and said engine that manages thermal content of said charge intake.

10 19. The system of claim 14, wherein said control mechanism utilizes fuel blending to control  
said composition.

20. The system of claim 14, wherein the charge intake is stratified so that the distribution of  
the reformat in the engine cylinder is non-uniform.

15 21. The system of claim 14, wherein the reformat is used to establish temperature gradients  
in the engine cylinder.

22. The system of claim 14, wherein the onboard fuel reformer is a fast starting reformer  
20 that allows for adequate engine operation during start up when the engine is run as a  
spark ignition engine and that allows for adequate engine operation in the presence of  
transients.

25 23. The system of claim 14, wherein the onboard fuel reformer is a plasmatron fuel  
converter.

24. The system of claim 14, wherein said onboard fuel reformer includes a catalyst.

25. The system of claim 14, where the reformat is premixed with air before being injected  
30 into the charge intake of the engine cylinder.

26. The system of claim 14, wherein the reformatte is injected directly into the charge intake of the engine cylinder.
27. The system of claim 14, wherein said control mechanism further controls a bias flow that increases or decreases fluid flow through the reformer.  
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